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# Motor Pool Facility

## Facility Environmental Monitoring Report

## Calendar Year 2003

BROOKHAVEN
NATIONAL LABORATORY

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# Brookhaven National Laboratory Motor Pool
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***Summary of Results***

*The solvents 1,1,1-trichloroethane and 1,1-dichloroethane, and the gasoline additive methyl tertiary butyl ether (MTBE) continue to be detected in groundwater at concentrations above regulatory limits. An increase in MTBE concentrations in a well that monitors the gasoline storage tank area lead to the implementation of the Groundwater Protection Contingency Plan, which resulted in a review of gasoline product reconciliation records and monitoring procedures. This review determined that the underground storage tanks and associated distribution lines are not leaking. Furthermore, all waste oils and used solvents are being properly stored and recycled. Therefore, it is believed that the contaminants detected in groundwater originate from historical vehicle maintenance activities, and are not related to current operations.*

## Background

The Motor Pool (Bldg. 423) and Site Maintenance facility (Bldg. 326) are attached structures located along West Princeton Avenue (Figure 1). The Motor Pool area consists of a five-bay automotive repair shop, which includes offices and storage space. The Site Maintenance facility provides office space, supply storage, locker room, and lunchroom facilities for custodial, grounds, and heavy equipment personnel. Both facilities have been in continuous use since 1947.

Potential environmental concerns at the Motor Pool include the use of underground storage tanks (USTs) to store gasoline, diesel fuel, and waste oil; hydraulic fluids used for lift stations; and solvents used for parts cleaning. In August 1989, the gasoline and waste oil USTs, pump islands, and associated piping were upgraded to conform with Suffolk County Article 12 requirements for secondary containment, leak detection devices, and overfill alarms. During the removal of the old USTs, there were no obvious signs of soil contamination. The present tank inventory includes two 8,000-gallon USTs used to store unleaded gasoline, one 260-gallon above-ground storage tank for waste oil, and one 3,000-gallon UST for Number 2 fuel oil.

The Motor Pool facility has five vehicle lift stations. The hydraulic fluid reservoirs for the lifts are located above ground. In February 1998, hydraulic fluid was observed leaking from one of the lift stations (BNL Spill Number 98-14). The lift was excavated and soil below the lift was contaminated with hydraulic oil. Approximately 50 cubic yards of the most contaminated soil were removed. Hydraulic oil products were not detected in groundwater samples collected from a monitoring well that was installed inside the building near the lift.

The only environmental concern associated with the Site Maintenance facility (Bldg. 326) was the December 1996 discovery of petroleum contaminated soil from an historic oil spill directly south of the building (BNL Spill Number 96-54). The site was excavated to the extent that the footings of the building were almost undermined. Although approximately 60 cubic yards of contaminated soil were removed, there was clear evidence that contaminated soil remained. Four wells were installed to determine whether the spill had impacted groundwater quality. Although oil breakdown products were not observed in the wells, the solvent 1,1,1-trichloroethane (TCA) and gasoline additive methyl tertiary butyl ether (MTBE) were detected at concentrations above New York State Ambient Water Quality Standards (NYS AWQS).

# Environmental Monitoring Program

In accordance with DOE Order 5400.1/450.1 (Environmental Protection), in 1996 BNL established a groundwater monitoring program at the Motor Pool facility's gasoline UST area to evaluate potential impacts to environmental quality from gasoline storage and dispensing operations. This monitoring program was expanded in 1999 to evaluate potential impact from the previously described oil spill found near Building 326. The groundwater monitoring program for the Motor Pool facility is described in the *BNL Environmental Monitoring Plan* (BNL, 2003).

## Monitoring Results

### Underground Storage Tank Area

The groundwater monitoring program for the underground storage tank area is designed to confirm that the current engineered and operational controls are effective in preventing contamination of the aquifer. Two wells (102-05 and 102-06) are used to monitor for potential contaminant releases from the UST/pump island area (Figure 1).

During 2003, MTBE was the only chemical related to gasoline products detected in groundwater downgradient of the gasoline UST area (Table 1). Compared to previous years when MTBE concentrations were less than the 10 µg/L NYS AWQS, MTBE concentrations in well 102-06 increased to 33.8 µg/L in March 2003, then decreased to 13 µg/L in September (Figure 2). As in past years, low levels of the solvent TCA was also detected, but at concentrations that continued to be below the NYS AWQS of 5 µg/L. Wells 102-05 and 102-06 were also tested semiannually for the presence of floating petroleum hydrocarbons. As in previous years, no floating product was observed.

As discussed below, monitoring of the UST leak detection systems and review of product reconciliation records suggest that the MTBE is not originating from a tank or distribution line leak. MTBE was used as a gasoline additive from 1977 through early 2003, and has been detected at low levels in the Motor Pool wells since the groundwater monitoring program began in 1996. The detection of both MTBE and TCA is consistent with the contamination routinely detected in the nearby wells that monitor Bldg. 423/326 (discussed below), and the contamination is likely to have originated from historical spills near Bldg. 423. The increase in MTBE levels in well 102-06 may have been

caused by a slight southwesterly shift in local groundwater flow direction, which resulted from increased pumpage from BNL water supply well 7.

### Building 423/326 Area

Groundwater quality downgradient of Bldg. 423 and Bldg. 326 is monitored using four wells (102-10, 102-11, 102-12, and 102-13). The program is designed to periodically assess existing solvent contamination that resulted from historical vehicle maintenance operations, potential impacts from the spill discovered in 1996, and to confirm that the current engineered and operational controls are effective in preventing additional contamination of the aquifer.

As in previous years, TCA was detected in all four wells, with concentrations ranging from 6 µg/L to 53.4 µg/L (Table 1, Figure 3). 1,1-dichloroethane (DCA) was detected in well 102-11 and 102-12 at concentrations up to 14.8 µg/L. The gasoline additive MTBE was detected in all four wells, with a maximum observed concentration of 27.3 µg/L.

## Evaluation of Current Operations

During 2003, there were no reported gasoline or motor oil losses or spills, and all waste oils and used solvents generated from current operations are being properly stored and recycled. The gasoline USTs have electronic leak detection systems, and there is a daily product reconciliation (i.e., an accounting of the volume of gasoline stored in underground storage tanks and volume of gasoline sold). As part of the Groundwater Protection Contingency Plan response to the increase in MTBE concentrations in well 102-06, personnel from Staff Services reviewed the product reconciliation records and monitoring procedures. The review concluded that there were no indications of leaks in the underground storage tanks or associated piping (Hauptman, 2003). It is believed that the contaminants detected in groundwater originate from historical vehicle maintenance and part degreasing operations.

# Future Monitoring Actions

The CY 2004 monitoring program will consist of:

- Monitor wells located downgradient of the gasoline UST area on a semiannual schedule, and test for floating product and VOCs.
- Monitor wells downgradient of the Building 423/326 area on an annual schedule, and test for VOCs.
- Staff Services Division will continue to review reconciliation records on a frequent basis.

# References

BNL, 2003. *Brookhaven National Laboratory Environmental Monitoring Plan, CY 2003 Triennial Update* (January 2003). BNL Report 52676.

Hauptman, H, 2003. Gasoline Reconciliation Summary for Building 423 and 630 (September 23, 2003).

**Table 1. Groundwater Monitoring: Volatile Organic Compound Analytical Results for CY 2003.**

**Downgradient of the Gasoline USTs**

| Well | Sample Date | 1,1,1-Trichloroethane | 1,1-Dichloroethane | Methyl tert-butyl ether |
|---|---|---|---|---|
| | | Conc. (ug/L) | Conc. (ug/L) | Conc. (ug/L) |
| **102-05** | **3/11/2003** | 2 | 2 U | 2 U |
| | **9/18/2003** | 1.6 J | 2 U | 2.7 |
| **102-06** | **3/11/2003** | 3 | 2 U | 33.8 |
| | **9/18/2003** | 2.9 | 2 U | 13.1 |
| **Typical MDL** | | 2 | 2 | 2 |
| **NYSAWQS** | | 5 | 5 | 10 |

**Downgradient of Building 426**

| Well | Sample Date | 1,1,1-Trichloroethane | 1,1-Dichloroethane | Methyl tert-butyl ether |
|---|---|---|---|---|
| | | Conc. (ug/L) | Conc. (ug/L) | Conc. (ug/L) |
| **102-10** | **3/10/2003** | 6 | 2 U | 2 U |
| | **9/18/2003** | 11.6 | 2 U | 6.5 |
| **102-11** | **9/18/2003** | 31.1 | 7.1 | 26.6 |
| **102-12** | **9/9/2003** | 53.4 | 14.8 | 4.8 |
| **102-13** | **9/18/2003** | 21.5 | 2 U | 27.3 |
| **Typical MDL** | | 2 | 2 | 2 |
| **NYSAWQS** | | 5 | 5 | 10 |

MDL: Minimum Detection Limit
J: Estimated Concentration
U: Compound not detected

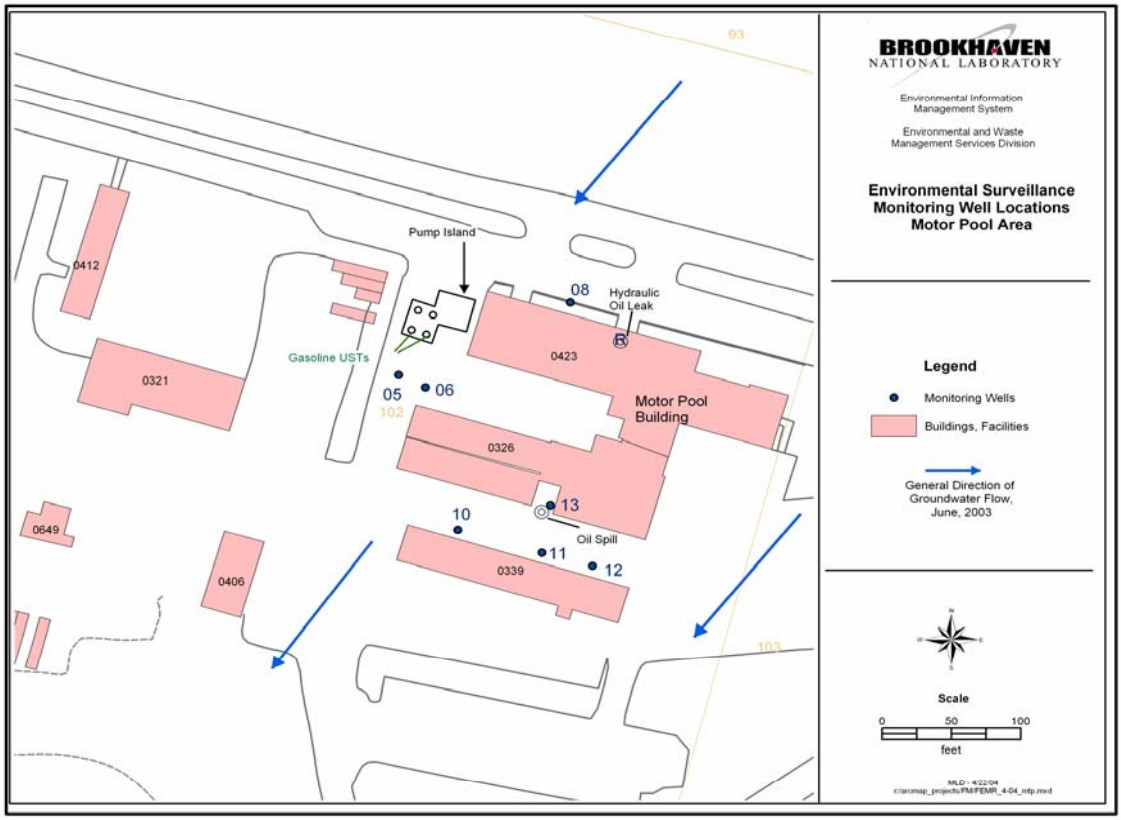


**Figure 1: Locations of Monitoring Wells in the BNL Motor Pool Area.**

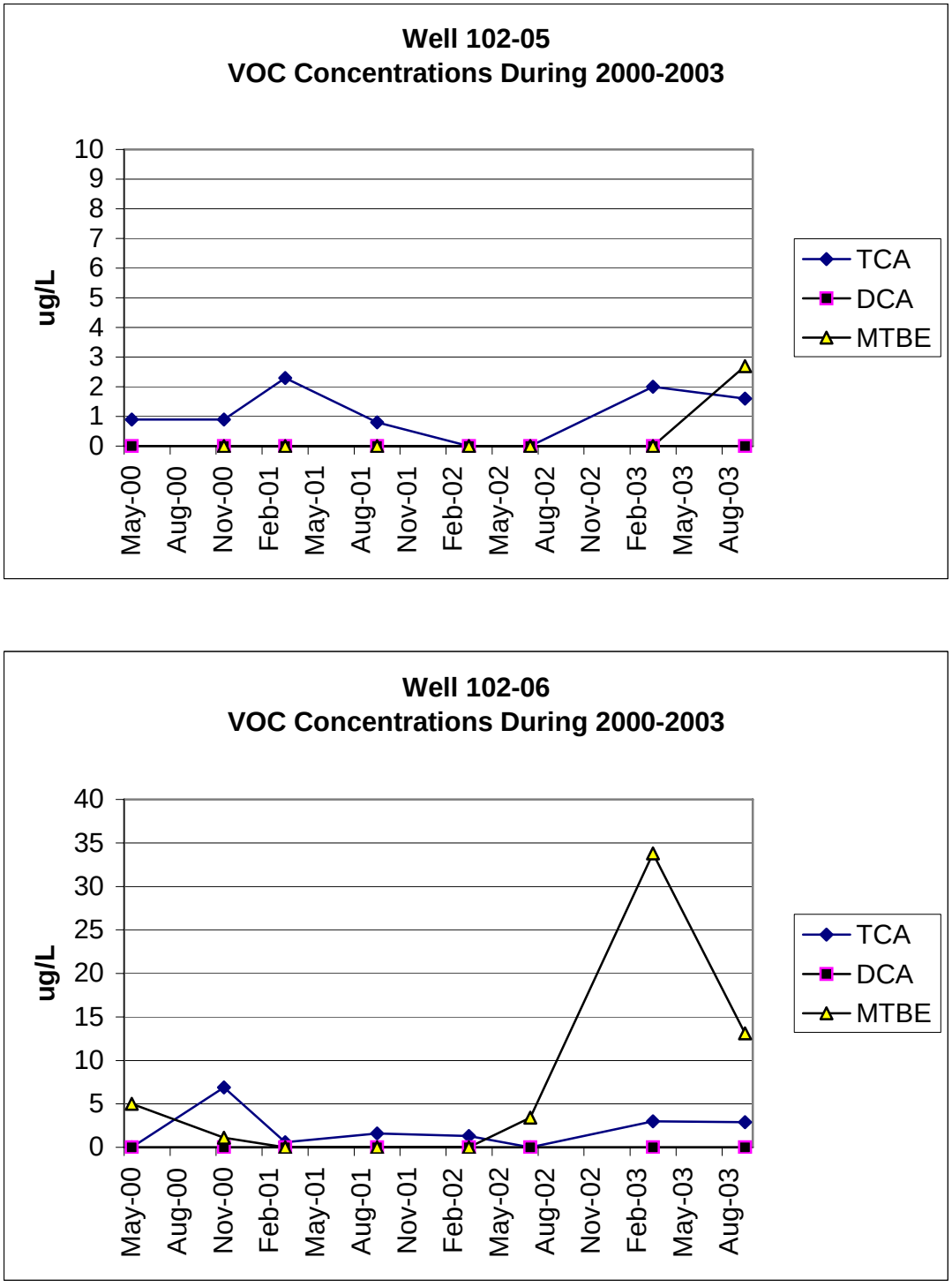


**Figure 2: VOC Concentration Trend Plots for Monitoring Wells Downgradient of the Motor Pool's Gasoline UST and Pump Island Areas.**

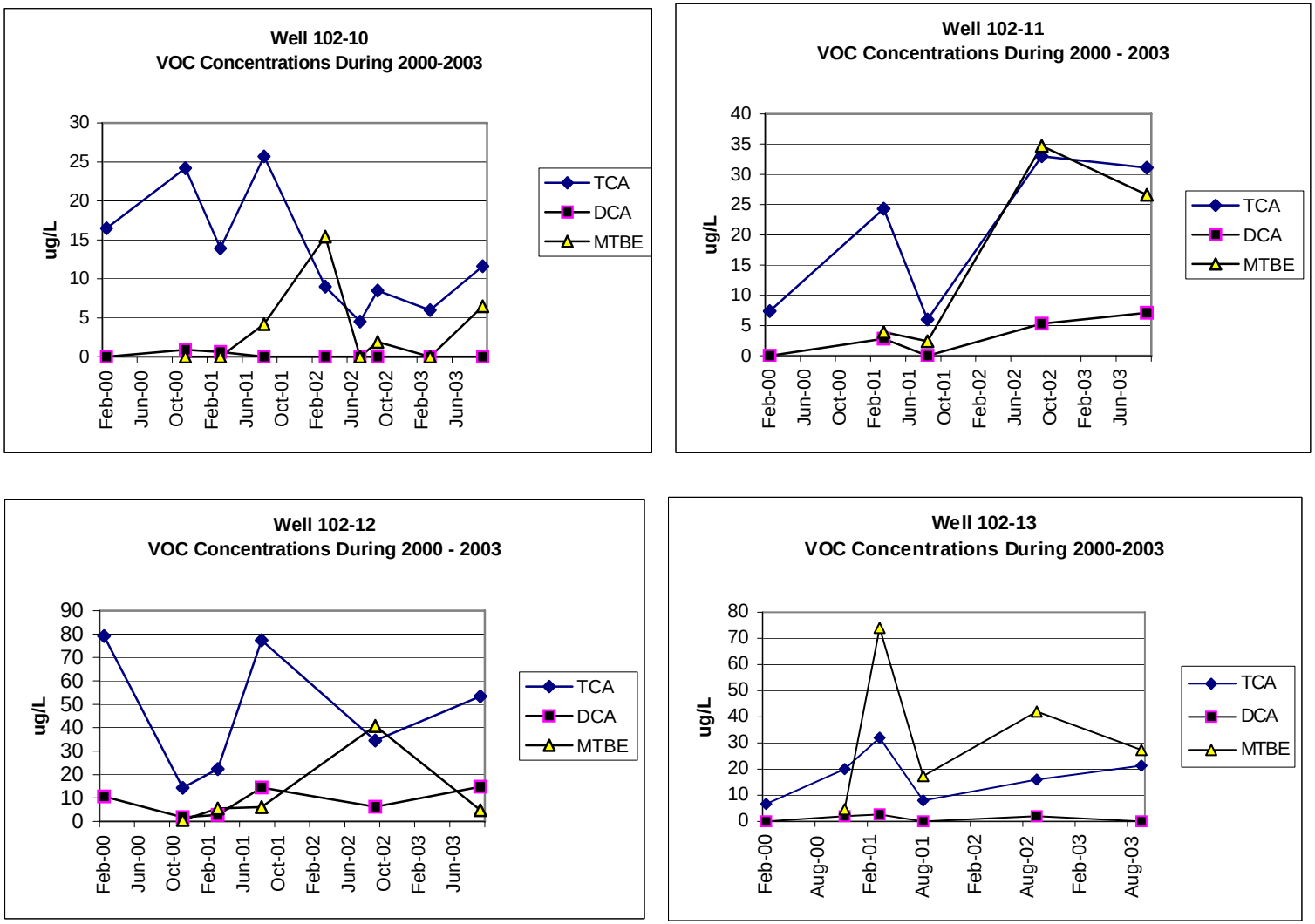


**Figure 3. VOC Concentration Trend Plots for Monitoring Wells Downgradient of the Building 423/326 Area.**